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SCIENTIFIC CONFERENCE OF THE DIVISION OF VIROLOGY, INSTITUTE OF
EPIDEMIOLOGY AND MICROBIOLOGY
IMENI N. F. GAMALEYA

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N. Medvedev

A Scientific Conference of the Division of Virology, Institute of Epidemiology and Microbiology imeni N. F. Gamaleya, was held at Moscow 11-13 April 1955. The Division of Virology is directed by Prof L. A. Zil'ber, Active Member of the Academy of Medical Sciences USSR. The conference dealt with problems in the field of oncology. During the conference, an extensive account was given by workers at Zil'ber's laboratory on the achievements made by them recently in the field of experimental investigation of malignant tumors from the standpoint of the virus theory.

Specialists from a number of Moscow institutes and laboratories doing related work participated in the conference. This includes the Institute of Experimental Pathology and Therapy of Cancer, the Institute of Experimental Biology, the Institute of Virology imeni Ivanovskiy, the Central Oncological Institute imeni Gertsen, etc. In addition to representatives of institutions located in Moscow, workers from other cities also participated in the conference (scientists active at the Institute of Oncology in Leningrad, Academy of Medical Sciences USSR; the Ukrainian Institute of Epidemiology and Microbiology at Kiev; the Kazan' Medical Institute; etc.)

At four sessions of the conference, 18 reports on problems of the immunology, etiology, and pathogenesis of tumors were presented. The conference has shown that the principal problem to which attention was paid by Zil'ber's laboratory in past years, i.e., the question in regard to presence of malignant tumors of specific antigens that are absent in normal homologous tissues, may be regarded as definitely solved at this time: an affirmative answer can be given to the question as to whether such specific antigens exist.

[After solution of the cardinal question mentioned above], further efforts of the staff of the laboratory were devoted to a clarification of the nature of the specific antigens in question, the possibility of their connection with some cytoplasmatic protein fractions or cell structures, the possibility that the antigenic composition of the tumor tissue may change in the process of malignization, and other aspects of the problem.

The experimental results presented at the conference testify to the complex nature of tumor antigens, which consist, in addition to the normal component, of at least two components whose presence can be established by means of the anaphylaxis test carried out subsequently to desensitization. These two components are (1) a specific tumor tissue component (tumor protein) and (2) a virus component (see data by D. A. Artamonova, V. A. Parnes, and others).

The specific tumor antigens may change during the process of malignization. Thus, V. A. Artamonova has shown that the tissue antigen of a Shope rabbit papilloma is immunologically distinct from the antigen of a Shope carcinoma.

In a number of investigations it has been shown that the active virus can be removed from a suspension of a Shope carcinoma by absorbing this virus on the erythrocytes of various animals. The fact that the virus is actually absorbed was established in animal experiments and also by immunological tests

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(cf N. Ya. Solov'yeva's data). On the other hand, experiments by L. A. Lyudogovskaya and T. T. Morgunova have shown that the specific component of the M-1 rat sarcoma cannot be adsorbed on erythrocytes. Preliminary data indicate that the specific antigens of human tumors can be adsorbed on erythrocytes.

Extensive experimental data were reported at the conference for the first time which demonstrate that vaccination is possible against the naturally developing cancer formation in mice of the cancer-susceptible strain A in which cancer is induced by the milk factor (Z. L. Baydakova). Data were also presented on the possibility of vaccination against Brown-Pierce rabbit carcinoma, the M-1 sarcoma, and mice sarcoma induced by cancerogenic substances (R. M. Radzikhovskaya, O. M. Lezhneva). The results of the experiments which have been carried out indicate that it is possible to lower the incidence of tumors in mice of the A strain and to slow down the process of the development of tumors in them by vaccinating the animals with the virus component of cancer of the lactic glands (breast cancer). Furthermore, the resistance of vaccinated rabbits, rats, and inbred mice to repeated transplantation of tumors could be considerably increased. As a result of the vaccination of the animals with cell-free lysates of tumors, not only a lower incidence of pathological processes in the vaccinated animals was obtained, but the life span of the sick animals could be increased and the frequency of the development of metastases lowered.

A number of papers dealt with results obtained in the investigation of antibodies arising in connection with the growth of tumors. After subjecting to investigation the serum of rats which had primary induced tumors, N. V. Nartsissov found that in these animals not only formation of induced antibodies, but also development of true antibodies apparently takes place.

In a report by A. N. Gardash'yan, data were presented which testified to the accumulation of antibodies in rabbits with Brown-Pierce tumors as well as in rabbits which had been vaccinated with different preparations derived from tumors of this type. No correlation was found between the degree of immunity and the presence of antibodies in the serum.

D. N. Levina studied the presence of specific antigens in mice tumors that are transplantable to animals which bear a genotypic relationship to these tumors. In experiments with hematomata the tissue identity of the tumor antigen with the control antigen was rigidly preserved. The results of immunological experiments have shown that the presence of specific tumor antigens in mice is not caused by genotypic differences between the host and the transplantate. A report by Z. A. Postnikova dealt with the problem of the blocking of viruses that produce tumors. Postnikova studied the possibility of the formation in rabbits of immunity to the Shope virus by introducing to the animals a virus that has been blocked with an extract from papillomas that had become malignant. As the experiments in question showed, not only the infectious properties of the virus, but also its capacity to produce immunity is suppressed by the process of blocking.

In other experiments by the same investigator, which dealt with the autotransplantation and homotransplantation of Shope papillomas, the absence in infected rabbits of immunity to repeated intramuscular introduction of the papillomas was shown. At the same time, the rabbits were found to be insusceptible to subcutaneous introduction of the virus. These experiments have demonstrated again that the immunity to tumor cells and the immunity to the tumor virus are produced by different immunological mechanisms.

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V. N. Stepina reported results of her experiments on the cultivation of Brown-Pierce tumors in the brain of mice. These experiments were successful. They showed that the growing of this tumor in the brain of mice does not change the tumor's antigenic properties during the course of nine passages.

In a paper by A. A. Kyazimova, a number of interesting data were presented on the fate of the virus of chicken sarcoma in the organism of insusceptible animals. V. V. Suntsova, I. N. Kryukova, and S. F. Malysheva investigated the action of cancerogenic substances and of extracts of nonfilterable tumors of rabbits, rats, and mice on cultures of embryo tissues. The results which have been obtained indicate that the extracts of these tumors contain an active agent which in combination with the cancerogenic substance modifies the morphology of cultures of embryo tissues so that these tissues acquire a resemblance with tumor tissue.

The investigation of a number of problems pertaining to the etiology and pathogenesis of tumors has led to the development in the laboratory of some original methods of investigation which appear promising.

Thus, the great complexity of the composition of antigens of tumor tissue which has been established in experiments naturally led to the necessity of differentiating in the studies between tumor proteins and normal tissue proteins and of clarifying the possible connection between the specific tumor condition and different protein fractions or morphologically distinct cell structures. With the aid of separators which had been produced in the USSR, G. I. Abelev developed a method of isolating from tumor tissues the nuclei of cytoplasmic granules and hyaloplasma proteins. He investigated their immunological and electrophoretic behavior and presented data which indicate that there is a possible connection of the specific antigen of the M-1 rat sarcoma with a fraction for which a definite electrophoretic mobility is typical.

Another method which deserves attention has been developed by T. G. Gasanov. This method enables one to concentrate relatively easily virus particles for the purpose of electron-microscopic investigation. With the aid of this method, the presence of virus-like particles in papillomas and polypoid human tumors was established (I. Ye. Shustrova and T. G. Gasanov). For the differentiation of tumor proteins from those of normal tissues, other methods in addition to immunological ones were used. G. I. Stepanchenok and Z. A. Avenirova applied electrophoretic procedures for the investigation of extracts from normal, papilloma, and carcinoma tissues of rabbits and obtained a number of interesting data which characterize the electrophoretic behavior of the extracts of the tissues mentioned.

In a report by Zil'ber which concluded the meeting, the laboratory data which had been obtained were analyzed and ways for the future study of the most important problems of tumor growth were outlined (this report by Zil'ber will be published soon in one of the issues of Voprosy Onkologii).

The reports which had been heard were subjected to a many-sided critical discussion. The most lively discussion was induced by problems pertaining to the nature of specific tumor antigens and specific antitumor antibodies (L. M. Shabad, N. N. Kosyakov, D. S. Gostev, and M. M. Kapichnikov). It was pointed out (by L. M. Shabad) that the investigations conducted at Zil'ber's laboratory deal predominantly with immunological problems, while insufficient attention is paid to the morphological investigation of the tumors (criticism by L. F. Larionov.)

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One must emphasize that the criticism of the information presented at the conference was businesslike and constructive. The tendency prevalent during the conference was one of contributing as much as possible to the solution of the basic problems of experimental oncology.

The Czech scientist Dr B. Keyl', who participated in the discussion, made a number of valuable comments on the biochemical results presented in the reports.

Prof A. I. Serebrov, director of the Institute of Oncology at Leningrad, Academy of Medical Sciences USSR, who also participated in the discussions, pointed out that the executives of the Academy of Medical Sciences and the departments of this academy which ought to be interested in oncological research pay insufficient attention to research in this field carried out within the Academy of Medical Sciences.

After completion of the conference, a trip was made to Zil'ber's Laboratory, where the participants at the conference familiarized themselves with the equipment and methods of oncological investigation which were of interest to them.

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